

Summary for Input Data

Plot Reference	B 201	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	5.55	TER	15.75
Environmental	96 A	% DER < TER			64.76
CO ₂ Emissions (t/year)	0.26	DFEE	33.48	TFEE	34.49
Compliance Check	See BREL	% DFEE < TFEE			2.93
% DPER < TPER	31.39	DPER	58.86	TPER	85.79

Assessor Details	Mr. Robert Tanner	Assessor ID	W344-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	179.96	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	23.20 m	52.43 m ²	2.80 m

8.0 Living Area	30.62	m ²
-----------------	-------	----------------

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.15	70.00	41.09	30.37	0.00	None	10.72	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	23.87	21.45	0.90	Stairwell Access Corridor 4	2.42	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00	70.00	17.22	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	103.60

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	52.43

Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
-------------	--------------	--------------	-----------------------------	------------------------

Summary for Input Data



Party Floor 1 Lowest occupied Precast concrete planks floor, screed, carpeted 40.00 52.43

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20
Door	Manufacturer	Door to Corridor				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North East	2.42	
NW windows	Window	External Wall 1	North West	5.96	
SW windows	Window	External Wall 1	South West	4.75	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	6.67	0.05	0.05	No
E3 Sill	Independently assessed	3.17	0.04	0.04	No
E4 Jamb	Independently assessed	15.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	22.55	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	17.05	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	6.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	12.30	0.00	0.00	No

Y-value 0.06 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

No

Summary for Input Data

22.0 Pressure Testing

Designed AP ₅₀	Yes	
Test Method	3.00	m³/(h.m²) @ 50 Pa
	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Lighting 1	75.00	15.00	1125.00	5

24.0 Main Heating 1

None

25.0 Main Heating 2

None

26.0 Heat Networks

Space Community Heating

Distribution Loss	Space and Water Combined
Distribution Loss Value	Calculated
SAP Code	1.50
	2306

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	Heat pump	Electricity	Space and Water	232.00	100.00					
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Community Heating
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Cold Water Source	From header tank
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type	Internal Store	
Cylinder Volume	Measured Loss	
Loss	180.00	L
	1.20	kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?	Multiple Dwellings – Not Connected
Connected To Dwelling	No
Diverter	Yes
Battery Capacity [kWh]	No
	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.25	South West	Horizontal	Modest		No	0.80		

Summary for Input Data



34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

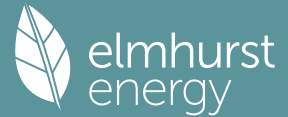
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	B 201				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.55	TER	15.75		
Environmental	96 A	% DER < TER				64.76	
CO ₂ Emissions (t/year)	0.26	DFEE	33.48	TFEE	34.49		
Compliance Check	See BREL	% DFEE < TFEE				2.93	
% DPER < TPER	31.39	DPER	58.86	TPER	85.79		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
Client							

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	52.4300 (1b)	2.8000 (2b)	146.8040 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.4300		146.8040 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	146.8040 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	2	(19)

Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												81.0000 (23c)
Effective ac	0.2576	0.2544	0.2512	0.2352	0.2321	0.2161	0.2161	0.2129	0.2225	0.2321	0.2384	0.2448 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Window			10.7200	1.1450	12.2748		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	41.0900	10.7200	30.3700	0.1500	4.5555	70.0000	2125.9000 (29a)
Corridor wall	23.8700	2.4200	21.4500	0.1800	3.8610	70.0000	1501.5001 (29a)
Total net area of external elements Aum(A, m ²)			64.9600				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	23.1113	(33)
Main dwelling							
Party Wall 1			17.2200	0.0000	0.0000	70.0000	1205.4000 (32)
Party Floor 1			52.4300			40.0000	2097.2000 (32d)
Party Ceiling 1			52.4300			30.0000	1572.9000 (32b)
Internal Wall 1			103.6000			9.0000	932.4000 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	9435.3000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		179.9599 (35)
List of Thermal Bridges		

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	6.6700	0.0500	0.3335
E3 Sill	3.1700	0.0400	0.1268
E4 Jamb	15.6000	0.0400	0.6240
E7 Party floor between dwellings (in blocks of flats)	22.5500	0.0500	1.1275
E7 Party floor between dwellings (in blocks of flats)	17.0500	0.0360	0.6138
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0500	0.3400
E16 Corner (normal)	5.6000	0.0500	0.2800
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E25 Staggered party wall between dwellings	2.8000	0.0360	0.1008
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.3000	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.6864 (36)
Point Thermal Bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	26.7977 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	12.4777	12.3233	12.1689	11.3968	11.2423	10.4702	10.4702	10.3158	10.7791	11.2423	11.5512	11.8600 (38)
Average = Sum(39)m / 12 =	39.2754	39.1210	38.9666	38.1945	38.0401	37.2680	37.2680	37.1135	37.5768	38.0401	38.3489	38.6577 (39)
												38.1559
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.7491	0.7462	0.7432	0.7285	0.7255	0.7108	0.7108	0.7079	0.7167	0.7255	0.7314	0.7373 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.7618 (42)											
Hot water usage for mixer showers	52.4002	51.5979	50.4156	48.5969	46.9673	44.6875	42.8844	44.9924	46.0526	48.3106	50.6621	52.3529 (42a)
Hot water usage for baths	22.7230	22.3800	21.8920	21.1612	20.5026	19.5960	18.9081	19.7492	20.1907	21.0890	22.0230	22.7050 (42b)
Hot water usage for other uses	32.6721	31.4841	30.2960	29.1079	27.9198	26.7317	26.7317	27.9198	29.1079	30.2960	31.4841	32.6721 (42c)
Average daily hot water use (litres/day)												99.0804 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	107.7953	105.4619	102.6036	98.8660	95.3897	91.0153	88.5243	92.6615	95.3512	99.6956	104.1691	107.7300 (44)
Energy content (annual)	158.6933	139.5475	146.6184	129.1437	122.9193	105.2561	97.8220	109.0642	110.6026	128.4678	140.7881	158.2094 (45)
Distribution loss (46)m = 0.15 x (45)m	23.8040	20.9321	21.9928	19.3715	18.4379	15.7884	14.6733	16.3596	16.5904	19.2702	21.1182	23.7314 (46)
Water storage loss (or HIU loss):												
Store volume												110.0000 (47)
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0152 (51)
Volume factor from Table 2a												1.0294 (52)
Temperature factor from Table 2b												0.6000 (53)
Enter (49) or (54) in (55)												1.0327 (55)
Total storage loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144 (56)
If cylinder contains dedicated solar storage	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	213.9701	189.4749	201.8952	182.6373	178.1961	158.7498	153.0988	164.3410	164.0963	183.7446	194.2817	213.4862 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	213.9701	189.4749	201.8952	182.6373	178.1961	158.7498	153.0988	164.3410	164.0963	183.7446	194.2817	213.4862 (64)
12Total per year (kWh/year)												2197.9721 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month	96.9869	86.3415	92.9721	85.7352	85.0921	77.7926	76.7472	80.4853	79.5703	86.9370	89.6070	96.8261 (65)

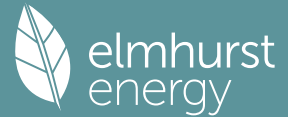
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.8224	86.1605	77.8224	80.4165	77.8224	80.4165	77.8224	77.8224	80.4165	77.8224	80.4165	77.8224 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	153.5409	155.1342	151.1192	142.5717	131.7821	121.6414	114.8667	113.2735	117.2885	125.8359	136.6256	146.7663 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702 (71)
Water heating gains (Table 5)	130.3588	128.4843	124.9625	119.0767	114.3711	108.0453	103.1549	108.1792	110.5143	116.8508	124.4541	130.1426 (72)
Total internal gains	411.1485	419.2054	403.3304	391.4912	373.4020	359.5295	345.2704	348.7014	357.6456	369.9355	390.9225	404.1576 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Southwest	4.7600	36.7938	0.3500	0.7000	0.7700	29.7359 (79)
Northwest	5.9600	11.2829	0.3500	0.7000	0.7700	11.4174 (81)

Full SAP Calculation Printout



Solar gains	41.1533	73.8917	111.1752	154.6359	188.6164	194.0313	184.2458	157.8585	126.0624	84.3822	49.9828	34.7718 (83)
Total gains	452.3018	493.0971	514.5056	546.1271	562.0184	553.5608	529.5162	506.5599	483.7080	454.3176	440.9053	438.9294 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	66.7318	66.9952	67.2606	68.6203	68.8989	70.3263	70.3263	70.6189	69.7483	68.8989	68.3440	67.7980
alpha	5.4488	5.4663	5.4840	5.5747	5.5933	5.6884	5.6884	5.7079	5.6499	5.5933	5.5563	5.5199
util living area	0.9549	0.9283	0.8825	0.7692	0.6111	0.4288	0.3094	0.3366	0.5286	0.7841	0.9154	0.9596 (86)
MIT	20.3509	20.5009	20.6779	20.8775	20.9699	20.9967	20.9996	20.9993	20.9895	20.8851	20.6231	20.3365 (87)
Th 2	20.2977	20.3002	20.3028	20.3157	20.3183	20.3313	20.3313	20.3339	20.3261	20.3183	20.3132	20.3080 (88)
util rest of house	0.9469	0.9164	0.8639	0.7390	0.5711	0.3848	0.2625	0.2881	0.4795	0.7493	0.8998	0.9523 (89)
MIT 2	19.5538	19.7397	19.9551	20.1945	20.2925	20.3291	20.3311	20.3336	20.3186	20.2089	19.9023	19.5444 (90)
Living area fraction									fLA = Living area / (4) =			0.5840 (91)
MIT	20.0193	20.1843	20.3772	20.5934	20.6881	20.7190	20.7215	20.7224	20.7104	20.6038	20.3233	20.0070 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0193	20.1843	20.3772	20.5934	20.6881	20.7190	20.7215	20.7224	20.7104	20.6038	20.3233	20.0070 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9433	0.9142	0.8660	0.7516	0.5930	0.4104	0.2899	0.3164	0.5077	0.7644	0.9000	0.9487 (94)
Useful gains	426.6562	450.7955	445.5661	410.4715	333.2731	227.1755	153.5044	160.2642	245.5646	347.2608	396.8328	416.4183 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	617.3824	597.9350	540.7475	446.6222	341.9080	228.0419	153.6000	160.4190	248.3968	380.5453	507.0979	611.0622 (97)
Space heating kWh	141.9003	98.8777	70.8149	26.0285	6.4243	0.0000	0.0000	0.0000	0.0000	24.7636	79.3909	144.8151 (98a)
Space heating requirement - total per year (kWh/year)												593.0153
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	141.9003	98.8777	70.8149	26.0285	6.4243	0.0000	0.0000	0.0000	0.0000	24.7636	79.3909	144.8151 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												593.0153
Space heating per m2										(98c) / (4) =		11.3106 (99)

9b. Energy requirements

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (301)
Fraction of space heat from community system												1.0000 (302)
Fraction of heat from community Heat pump-Space and Water												1.0000 (303a)
Factor for control and charging method (Table 4c(3)) for space heating												1.0000 (305)
Factor for charging method (Table 4c(3)) for water heating												1.0000 (305a)
Distribution loss factor (Table 12c) for community heating system												1.5000 (306)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating:												
Space heating requirement	141.9003	98.8777	70.8149	26.0285	6.4243	0.0000	0.0000	0.0000	0.0000	24.7636	79.3909	144.8151 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	212.8504	148.3166	106.2224	39.0427	9.6365	0.0000	0.0000	0.0000	0.0000	37.1455	119.0863	217.2226
Space heating requirement	212.8504	148.3166	106.2224	39.0427	9.6365	0.0000	0.0000	0.0000	0.0000	37.1455	119.0863	217.2226 (307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)												0.0000 (308)
Space heating fuel for secondary/supplementary system	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (309)

Water heating												
Annual water heating requirement	213.9701	189.4749	201.8952	182.6373	178.1961	158.7498	153.0988	164.3410	164.0963	183.7446	194.2817	213.4862 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	320.9551	284.2123	302.8428	273.9560	267.2942	238.1247	229.6482	246.5115	246.1444	275.6169	291.4226	320.2293
Water heating fuel	320.9551	284.2123	302.8428	273.9560	267.2942	238.1247	229.6482	246.5115	246.1444	275.6169	291.4226	320.2293 (310)
Cooling System Energy Efficiency Ratio												0.0000 (314)
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (315)
Pumps and Fa	11.9789	10.8197	11.9789	11.5925	11.9789	11.5925	11.9789	11.9789	11.5925	11.9789	11.5925	11.9789 (331)
Lighting	16.7181	13.4119	12.0759	8.8473	6.8339	5.5834	6.2341	8.1034	10.5255	13.8100	15.5984	17.1827 (332)
Electricity generated by PVs (Appendix M) (negative quantity)	(333a)m	-2.7517	-4.8941	-9.0496	-12.7696	-15.9980	-15.7938	-15.4637	-13.2900	-9.9690	-6.3908	-3.3069
Electricity generated by wind turbines (Appendix M) (negative quantity)	(334a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (334a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	(335a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335a)
Electricity generated by PVs (Appendix M) (negative quantity)	(333b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (333b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	(334b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (334b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	(335b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335b)
Annual totals kWh/year												
Space heating fuel - community heating												889.5230 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3296.9581 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												8.8952 (313)
Space cooling fuel												0.0000 (321)

Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)												
mechanical ventilation fans (SFP = 0.7875)												141.0419 (330a)
Total electricity for the above, kWh/year												141.0419 (331)
Electricity for lighting (calculated in Appendix L)												134.9246 (332)

Energy saving/generation technologies (Appendices M ,N and Q)

Full SAP Calculation Printout



PV generation	-111.9226 (333)
Wind generation	0.0000 (334)
Hydro-electric generation (Appendix N)	0.0000 (335a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (335)
Appendix Q - special features	
Energy saved or generated	-0.0000 (336)
Energy used	0.0000 (337)
Total delivered energy for all uses	4350.5250 (338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Efficiency of heat source Heat pump			232.0000 (367)
Space and Water heating from Heat pump	1804.5177	0.1574	60.3334 (367)
Electrical energy for heat distribution (space & water)	8.8952	0.0000	6.0395 (372)
Overall CO2 factor for heat network			0.0636 (386)
Total CO2 associated with community systems			266.3617 (373)
Space and water heating			266.3617 (376)
Pumps, fans and electric keep-hot	141.0419	0.1387	19.5643 (378)
Energy for lighting	134.9246	0.1443	19.4738 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.9226	0.1305	-14.6049
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.6049 (380)
Total CO2, kg/year			290.7949 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.5500 (384)

13b. Primary energy - Community heating scheme

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Efficiency of heat source Heat pump			232.0000 (467a)
Space and Water heating from Heat pump	1804.5177	1.5825	606.7692 (467)
Electrical energy for heat distribution (space & water)	8.8952	0.0000	64.2024 (472)
Overall CO2 factor for heat network			0.6764 (486)
Total CO2 associated with community systems			2831.5469 (473)
Space and water heating			2831.5469 (476)
Pumps, fans and electric keep-hot	141.0419	1.5128	213.3682 (478)
Energy for lighting	134.9246	1.5338	206.9518 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.9226	1.4820	-165.8730
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-165.8730 (480)
Total Primary energy kWh/year			3085.9940 (483)
Dwelling Primary energy Rate (DPER)			58.8600 (484)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022) CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	52.4300 (1b)	x 2.8000 (2b)	= 146.8040 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.4300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 146.8040 (5)

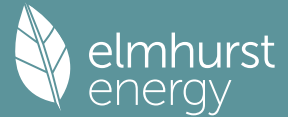
2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1362 (8)
Pressure Test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3862	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =		0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =		0.3283 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												

Full SAP Calculation Printout



Effective ac	0.4186	0.4104	0.4022	0.3611	0.3529	0.3119	0.3119	0.3037	0.3283	0.3529	0.3693	0.3858 (22b)
	0.5876	0.5842	0.5809	0.5652	0.5623	0.5486	0.5486	0.5461	0.5539	0.5623	0.5682	0.5744 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K					
Main dwelling												
TER Opaque door			2.4200	1.0000	2.4200		(26)					
TER Opening Type			10.6900	1.1450	12.2405		(27)					
External Wall 1	41.0900	10.6900	30.4000	0.1800	5.4720		(29a)					
Corridor wall	23.8700	2.4200	21.4500	0.1800	3.8610		(29a)					
Total net area of external elements Aum(A, m2)			64.9600				(31)					
Fabric heat loss, W/K = Sum (A x U)					(26)... (30) + (32) =	23.9935	(33)					
Main dwelling												
Party Wall 1			17.2200	0.0000	0.0000		(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							179.9599 (35)					
List of Thermal Bridges												
K1 Element				Length	Psi-value	Total						
E1 Steel lintel with perforated steel base plate				6.6700	0.0500	0.3335						
E3 Sill				3.1700	0.0500	0.1585						
E4 Jamb				15.6000	0.0500	0.7800						
E7 Party floor between dwellings (in blocks of flats)				22.5500	0.0700	1.5785						
E7 Party floor between dwellings (in blocks of flats)				17.0500	0.0700	1.1935						
E9 Balcony between dwellings, wall insulation continuous				6.8000	0.0200	0.1360						
E16 Corner (normal)				5.6000	0.0900	0.5040						
E18 Party wall between dwellings				2.8000	0.0600	0.1680						
E25 Staggered party wall between dwellings				2.8000	0.0600	0.1680						
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				12.3000	0.0000	0.0000						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.0200 (36)					
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	29.0135 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 28.4668	Feb 28.3020	Mar 28.1404	Apr 27.3817	May 27.2397	Jun 26.5789	Jul 26.5789	Aug 26.4565	Sep 26.8334	Oct 27.2397	Nov 27.5269	Dec 27.8271 (38)
Heat transfer coeff	57.4802	57.3154	57.1539	56.3951	56.2532	55.5923	55.5923	55.4699	55.8469	56.2532	56.5403	56.8406 (39)
Average = Sum(39)m / 12 =												56.3944
HLP	Jan 1.0963	Feb 1.0932	Mar 1.0901	Apr 1.0756	May 1.0729	Jun 1.0603	Jul 1.0603	Aug 1.0580	Sep 1.0652	Oct 1.0729	Nov 1.0784	Dec 1.0841 (40)
HLP (average)												1.0756
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

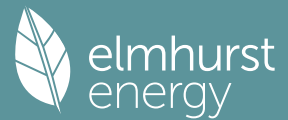
4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7618 (42)
Hot water usage for mixer showers													
53.7583	52.9505	51.7732	49.5208	47.8585	46.0048	44.9511	46.1195	47.4002	49.3905	51.6914	53.5524	(42a)	
Hot water usage for baths													
23.2411	22.8959	22.4099	21.5136	20.8426	20.0985	19.6965	20.1792	20.7047	21.5009	22.4156	23.1625	(42b)	
Hot water usage for other uses													
32.6721	31.4841	30.2960	29.1079	27.9198	26.7317	26.7317	27.9198	29.1079	30.2960	31.4841	32.6721	(42c)	
Average daily hot water use (litres/day)												100.8135 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
109.6716	107.3304	104.4791	100.1423	96.6209	92.8350	91.3794	94.2185	97.2128	101.1875	105.5910	109.3870	(44)	
Energy content	173.6929	152.8371	160.5804	137.0898	130.0703	114.1515	110.5155	116.6622	119.8731	137.3104	150.4338	(45)	
Energy content (annual)										Total = Sum(45)m =		1674.4908	
Distribution loss (46)m = 0.15 x (45)m													
26.0539	22.9256	24.0871	20.5635	19.5106	17.1227	16.5773	17.4993	17.9810	20.5966	22.5651	25.6910	(46)	
Water storage loss (or HIU loss):													
Store volume												180.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.8381 (55)	
Total storage loss													
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)	
If cylinder contains dedicated solar storage													
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month													
222.9356	197.3144	209.8231	184.7440	179.3130	161.8057	159.7582	165.9049	167.5273	186.5531	198.0880	220.5163	(62)	
WWHRS	-24.5761	-21.7353	-22.7599	-18.8461	-17.5639	-15.0296	-14.0878	-14.9810	-15.5502	-18.3319	-20.7679	-24.1210 (63a)	
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)	
Output from w/h													
198.3595	175.5791	187.0632	165.8979	161.7491	146.7761	145.6703	150.9239	151.9772	168.2212	177.3201	196.3954	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2025.9329 (64)	
Electric shower(s)												2026 (64)	
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)	
Heat gains from water heating, kWh/month													
97.1470	86.4001	92.7871	83.7057	82.6425	76.0787	76.1405	78.1843	77.9812	85.0499	88.1426	96.3426	(65)	

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	Jan 88.0878	Feb 88.0878	Mar 88.0878	Apr 88.0878	May 88.0878	Jun 88.0878	Jul 88.0878	Aug 88.0878	Sep 88.0878	Oct 88.0878	Nov 88.0878	Dec 88.0878 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
77.8422	86.1824	77.8422	80.4369	77.8422	80.4369	77.8422	77.8422	80.4369	77.8422	80.4369	77.8422 (67)	
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
153.5409	155.1342	151.1192	142.5717	131.7821	121.6414	114.8667	113.2735	117.2885	125.8359	136.6256	146.7663 (68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088 (69)	

Full SAP Calculation Printout



Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702 (71)
Water heating gains (Table 5)	130.5740	128.5716	124.7139	116.2580	111.0787	105.6649	102.3394	105.0864	108.3072	114.3143	122.4203	129.4928 (72)
Total internal gains	414.3834	422.3146	406.1016	391.6929	373.1293	357.1695	344.4747	345.6284	355.4589	370.4187	391.9090	406.5276 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W	
Southwest				4.7500	36.7938	0.6300	0.7000		0.7700		53.4122 (79)	
Northwest				5.9400	11.2829	0.6300	0.7000		0.7700		20.4824 (81)	
Solar gains	73.8946	132.6732	199.6004	277.6045	338.5875	348.3001	330.7375	283.3823	226.3204	151.5046	89.7476	62.4367 (83)
Total gains	488.2780	554.9878	605.7020	669.2975	711.7167	705.4696	675.2122	629.0107	581.7793	521.9234	481.6567	468.9642 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)											
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	45.5968	45.7280	45.8572	46.4742	46.5915	47.1453	47.1453	47.2493	46.9304	46.5915	46.3548	46.1100
alpha	4.0398	4.0485	4.0571	4.0983	4.1061	4.1430	4.1430	4.1500	4.1287	4.1061	4.0903	4.0740
util living area	0.9669	0.9449	0.9051	0.8116	0.6656	0.4892	0.3588	0.3999	0.6159	0.8472	0.9430	0.9711 (86)
MIT	19.7026	19.9397	20.2529	20.6279	20.8678	20.9714	20.9937	20.9903	20.9276	20.6179	20.1141	19.6677 (87)
Th 2	20.0038	20.0064	20.0089	20.0208	20.0230	20.0334	20.0334	20.0353	20.0294	20.0230	20.0185	20.0138 (88)
util rest of house	0.9598	0.9337	0.8861	0.7769	0.6121	0.4208	0.2816	0.3186	0.5438	0.8103	0.9295	0.9649 (89)
MIT 2	18.5227	18.8190	19.2045	19.6532	19.9114	20.0154	20.0309	20.0311	19.9787	19.6553	19.0496	18.4861 (90)
Living area fraction	19.2118	19.4735	19.8168	20.2224	20.4699	20.5737	20.5932	20.5913	20.5329	20.2175	19.6712	19.1762 (92)
MIT	19.2118	19.4735	19.8168	20.2224	20.4699	20.5737	20.5932	20.5913	20.5329	20.2175	19.6712	19.1762 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2118	19.4735	19.8168	20.2224	20.4699	20.5737	20.5932	20.5913	20.5329	20.2175	19.6712	19.1762 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9529	0.9266	0.8820	0.7845	0.6373	0.4595	0.3266	0.3658	0.5823	0.8183	0.9239	0.9584 (94)
Useful gains	465.2910	514.2307	534.2172	525.0614	453.6090	324.1806	220.5011	230.1194	338.7467	427.1027	444.9889	449.4544 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	857.1324	835.2870	761.1064	638.5306	493.3370	332.0942	221.9909	232.4895	359.2560	541.0130	710.7828	851.2543 (97)
Space heating kWh	291.5301	215.7498	168.8056	81.6978	29.5576	0.0000	0.0000	0.0000	0.0000	84.7492	191.3716	298.9391 (98a)
Space heating requirement - total per year (kWh/year)												1362.4008
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	291.5301	215.7498	168.8056	81.6978	29.5576	0.0000	0.0000	0.0000	0.0000	84.7492	191.3716	298.9391 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1362.4008
Space heating per m2										(98c) / (4) =		25.9851 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)											
Fraction of space heat from main system(s)	1.0000 (202)											
Efficiency of main space heating system 1 (in %)	92.3000 (206)											
Efficiency of main space heating system 2 (in %)	0.0000 (207)											
Efficiency of secondary/supplementary heating system, %	0.0000 (208)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	291.5301	215.7498	168.8056	81.6978	29.5576	0.0000	0.0000	0.0000	0.0000	84.7492	191.3716	298.9391 (98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating fuel (main heating system)	315.8505	233.7484	182.8879	88.5133	32.0234	0.0000	0.0000	0.0000	0.0000	91.8193	207.3365	323.8777 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	198.3595	175.5791	187.0632	165.8979	161.7491	146.7761	145.6703	150.9239	151.9772	168.2212	177.3201	196.3954 (64)
Efficiency of water heater (217)m	84.9219	84.5229	83.8302	82.5610	81.0695	79.8000	79.8000	79.8000	79.8000	82.6048	84.2311	79.8000 (216)
Fuel for water heating, kWh/month	233.5787	207.7295	223.1453	200.9397	199.5191	183.9300	182.5443	189.1277	190.4476	203.6458	210.5161	84.9991 (217)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	16.1741	12.9754	11.6829	8.5594	6.6115	5.4017	6.0313	7.8397	10.1830	13.3606	15.0908	16.6236 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-5.8268	-9.0577	-14.3400	-17.8146	-20.7645	-19.9700	-19.7343	-17.8422	-14.8149	-11.0592	-6.6994	-4.9447 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												

Full SAP Calculation Printout



(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-1.1521	-2.5295	-5.2326	-8.1717	-11.1194	-11.2846	-11.1464	-9.2869	-6.6175	-3.7103	-1.5671	-0.9031	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1476.0572	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												79.8000	
Water heating fuel used												2456.1794	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												86.0000	(231)
Electricity for lighting (calculated in Appendix L)												130.5340	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-235.5895	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												3913.1811	(238)

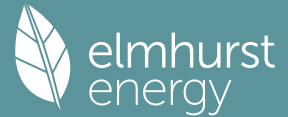
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1476.0572	0.2100	309.9720	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2456.1794	0.2100	515.7977	(264)
Space and water heating			825.7697	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	130.5340	0.1443	18.8401	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-162.8683	0.1326	-21.5957	
PV Unit electricity exported	-72.7212	0.1248	-9.0748	
Total			-30.6705	(269)
Total CO2, kg/year			825.8685	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.7500	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1476.0572	1.1300	1667.9446	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2456.1794	1.1300	2775.4828	(278)
Space and water heating			4443.4274	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	130.5340	1.5338	200.2173	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-162.8683	1.4899	-242.6637	
PV Unit electricity exported	-72.7212	0.4580	-33.3069	
Total			-275.9705	(283)
Total Primary energy kWh/year			4497.7750	(286)
Target Primary Energy Rate (TPER)			85.7900	(287)

Full SAP Calculation Printout



Plot Reference	B 201	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	82 B	DER	5.55
Environmental	96 A	TER	15.75
CO ₂ Emissions (t/year)	0.26	% DER < TER	64.76
Compliance Check	See BREL	DFEE	33.48
% DPER < TPER	31.39	TFEE	34.49
		% DFEE < TFEE	2.93
		DPER	58.86
		TPER	85.79
Assessor Details	Mr. Robert Tanner	Assessor ID	W344-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling	52.4300	2.8000	146.8040
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.4300		
Dwelling volume			

2. Ventilation rate

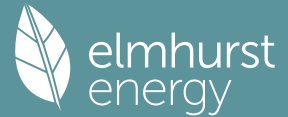
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1362 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2862 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2433 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3102	0.3041	0.2980	0.2676	0.2615	0.2311	0.2311	0.2251	0.2433	0.2615	0.2737	0.2859 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5481	0.5462	0.5444	0.5358	0.5342	0.5267	0.5267	0.5253	0.5296	0.5342	0.5375	0.5409 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Window			10.7200	1.1450	12.2748		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	41.0900	10.7200	30.3700	0.1500	4.5555	70.0000	2125.9000 (29a)
Corridor wall	23.8700	2.4200	21.4500	0.1800	3.8610	70.0000	1501.5001 (29a)
Total net area of external elements Aum(A, m ²)			64.9600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.1113		(33)
Main dwelling							
Party Wall 1			17.2200	0.0000	0.0000	70.0000	1205.4000 (32)
Party Floor 1			52.4300			40.0000	2097.2000 (32a)
Party Ceiling 1			52.4300			30.0000	1572.9000 (32b)
Internal Wall 1			103.6000			9.0000	932.4000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9435.3000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							179.9599 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					6.6700	0.0500	0.3335
E3 Sill					3.1700	0.0400	0.1268

Full SAP Calculation Printout



E4 Jamb									15.6000		0.0400		0.6240	
E7 Party floor between dwellings (in blocks of flats)									22.5500		0.0500		1.1275	
E7 Party floor between dwellings (in blocks of flats)									17.0500		0.0360		0.6138	
E9 Balcony between dwellings, wall insulation continuous									6.8000		0.0500		0.3400	
E16 Corner (normal)									5.6000		0.0500		0.2800	
E18 Party wall between dwellings									2.8000		0.0500		0.1400	
E25 Staggered party wall between dwellings									2.8000		0.0360		0.1008	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)									12.3000		0.0000		0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)													3.6864	(36)
Point Thermal bridges													0.0000	
Total fabric heat loss										(33) + (36) + (36a) =			26.7977	(37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)														
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Heat transfer coeff	26.5536	26.4631	26.3744	25.9576	25.8797	25.5167	25.5167	25.4495	25.6565	25.8797	26.0374	26.2023		(38)
Average = Sum(39)m / 12 =	53.3513	53.2608	53.1721	52.7553	52.6774	52.3144	52.3144	52.2472	52.4542	52.6774	52.8351	53.0000		(39)
												52.7550		
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
HLP (average)	1.0176	1.0158	1.0142	1.0062	1.0047	0.9978	0.9978	0.9965	1.0005	1.0047	1.0077	1.0109		(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31		

4. Water heating energy requirements (kWh/year)														

Assumed occupancy														1.7618 (42)
Hot water usage for mixer showers														
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(42a)
Hot water usage for baths														
	22.7230	22.3800	21.8920	21.1612	20.5026	19.5960	18.9081	19.7492	20.1907	21.0890	22.0230	22.7050		(42b)
Hot water usage for other uses														
	32.6721	31.4841	30.2960	29.1079	27.9198	26.7317	26.7317	27.9198	29.1079	30.2960	31.4841	32.6721		(42c)
Average daily hot water use (litres/day)												50.7715		(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Energy conte	55.3951	53.8640	52.1880	50.2691	48.4224	46.3277	45.6399	47.6691	49.2986	51.3850	53.5070	55.3771		(44)
Energy content (annual)	81.5512	71.2730	74.5755	65.6640	62.3972	53.5765	50.4334	56.1074	57.1839	66.2147	72.3166	81.3253		(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		792.6186		
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(46)
Water storage loss (or HIU loss):														
Total storage loss														
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(56)
If cylinder contains dedicated solar storage														
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(61)
Total heat required for water heating calculated for each month														
	69.3185	60.5820	63.3892	55.8144	53.0376	45.5400	42.8684	47.6913	48.6063	56.2825	61.4691	69.1265		(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63d)
Output from w/h	69.3185	60.5820	63.3892	55.8144	53.0376	45.5400	42.8684	47.6913	48.6063	56.2825	61.4691	69.1265		(64)
									Total per year (kWh/year) = Sum(64)m =			673.7258		(64)
12Total per year (kWh/year)												674		(64)
Electric shower(s)														
	43.0515	38.3592	41.8868	39.9721	40.7221	38.8450	40.1398	40.7221	39.9721	41.8868	41.0992	43.0515		(64a)
												489.7080		(64a)
Heat gains from water heating, kWh/month	28.0925	24.7353	26.3190	23.9466	23.4399	21.0962	20.7520	22.1033	22.1446	24.5423	25.6421	28.0445		(65)

5. Internal gains (see Table 5 and 5a)														

Metabolic gains (Table 5), Watts														
(66)m	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878		(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5														
	77.8224	86.1605	77.8224	80.4165	77.8224	80.4165	77.8224	77.8224	80.4165	77.8224	80.4165	77.8224		(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5														
	153.5409	155.1342	151.1192	142.5717	131.7821	121.6414	114.8667	113.2735	117.2885	125.8359	136.6256	146.7663		(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5														
	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088		(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(70)
Losses e.g. evaporation (negative values) (Table 5)														
	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702		(71)
Water heating gains (Table 5)														
	37.7587	36.8085	35.3750	33.2592	31.5053	29.3003	27.8925	29.7088	30.7564	32.9870	35.6140	37.6942		(72)
Total internal gains	318.5484	327.5296	313.7429	305.6737	290.5361	280.7845	270.0080	270.2310	277.8877	286.0717	302.0823	311.7092		(73)

6. Solar gains														

[Jan]				Area		Solar flux		g		FF		Access		Gains
				m2		Table 6a		Specific data		Specific data		factor		W
						W/m2		or Table 6b		or Table 6c		Table 6d		
Southwest				4.7600		36.7938		0.3500		0.7000		0.7700		29.7359 (79)
Northwest				5.9600		11.2829		0.3500		0.7000		0.7700		11.4174 (81)

Solar gains	41.1533	73.8917	111.1752	154.6359	188.6164	194.0313	184.2458	157.8585	126.0624	84.3822	49.9828	34.7718		(83)
Total gains	359.7017	401.4213	424.9182	460.3096	479.1525	474.8159	454.2539	428.0895	403.9501	370.4538	352.0652	346.4810		(84)

7. Mean internal temperature (heating season)														

Full SAP Calculation Printout



Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	49.1256	49.2091	49.2912	49.6806	49.7541	50.0993	50.0993	50.1638	49.9658	49.7541	49.6056	49.4513
alpha	4.2750	4.2806	4.2861	4.3120	4.3169	4.3400	4.3400	4.3443	4.3311	4.3169	4.3070	4.2968
util living area	0.9876	0.9790	0.9635	0.9174	0.8208	0.6511	0.4933	0.5404	0.7653	0.9317	0.9776	0.9893 (86)
MIT	19.5480	19.7405	20.0192	20.4128	20.7374	20.9302	20.9834	20.9755	20.8563	20.4489	19.9399	19.5135 (87)
Th 2	20.0687	20.0701	20.0716	20.0782	20.0794	20.0852	20.0852	20.0862	20.0829	20.0794	20.0769	20.0743 (88)
util rest of house	0.9847	0.9742	0.9548	0.8970	0.7772	0.5755	0.3968	0.4421	0.6984	0.9106	0.9716	0.9869 (89)
MIT 2	18.7486	18.9397	19.2146	19.5976	19.8918	20.0479	20.0795	20.0771	19.9966	19.6389	19.1436	18.7186 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.2155	19.4074	19.6845	20.0737	20.3856	20.5632	20.6074	20.6018	20.4987	20.1120	19.6086	19.1828 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.2155	19.4074	19.6845	20.0737	20.3856	20.5632	20.6074	20.6018	20.4987	20.1120	19.6086	19.1828 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9813	0.9699	0.9504	0.8969	0.7927	0.6163	0.4527	0.4987	0.7305	0.9115	0.9678	0.9838 (94)
Useful gains	352.9853	389.3493	403.8500	412.8294	379.8327	292.6225	205.6413	213.4839	295.0936	337.6504	340.7457	340.8775 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	795.7606	772.6766	701.0486	589.4717	457.5356	311.9589	209.6432	219.5319	335.6394	501.0661	660.8947	794.0894 (97)
Space heating kWh	329.4248	257.5959	221.1157	127.1825	57.8109	0.0000	0.0000	0.0000	0.0000	121.5812	230.5073	337.1897 (98a)
Space heating requirement - total per year (kWh/year)	1682.4081											
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	0.0000											
Space heating kWh	329.4248	257.5959	221.1157	127.1825	57.8109	0.0000	0.0000	0.0000	0.0000	121.5812	230.5073	337.1897 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1682.4081											
Space heating per m2	(98c) / (4) = 32.0887 (99)											

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	491.7557	387.1268	397.0789	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8397	0.9027	0.8780	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	412.9502	349.4433	348.6507	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	527.0210	504.6126	475.4146	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	82.1310	115.4460	94.3123	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	20.5328	28.8615	23.5781	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	72.9723 (107)											
Energy for space heating	32.0887 (99)											
Energy for space cooling	1.3918 (108)											
Total	33.4805 (109)											
Fabric Energy Efficiency (DFEE)	33.5 (109)											

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	52.4300 (1b)	x 2.8000 (2b)	= 146.8040 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.4300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	146.8040 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	(6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(7a)+(7b)+(7c) =
Pressure test	20.0000 / (5) = 0.1362 (8)
	Yes

Full SAP Calculation Printout



Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Blower Door
5.0000 (17)
0.3862 (18)
2 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3283 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4186	0.4104	0.4022	0.3611	0.3529	0.3119	0.3119	0.3037	0.3283	0.3529	0.3693	0.3858	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.5876	0.5842	0.5809	0.5652	0.5623	0.5486	0.5486	0.5461	0.5539	0.5623	0.5682	0.5744	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			10.6900	1.1450	12.2405			(27)
External Wall 1	41.0900	10.6900	30.4000	0.1800	5.4720			(29a)
Corridor wall	23.8700	2.4200	21.4500	0.1800	3.8610			(29a)
Total net area of external elements Aum(A, m2)			64.9600					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	23.9935		(33)
Main dwelling								
Party Wall 1			17.2200	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							179.9599	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	6.6700	0.0500	0.3335	
E3 Sill	3.1700	0.0500	0.1585	
E4 Jamb	15.6000	0.0500	0.7800	
E7 Party floor between dwellings (in blocks of flats)	22.5500	0.0700	1.5785	
E7 Party floor between dwellings (in blocks of flats)	17.0500	0.0700	1.1935	
E9 Balcony between dwellings, wall insulation continuous	6.8000	0.0200	0.1360	
E16 Corner (normal)	5.6000	0.0900	0.5040	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.3000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.0200 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	29.0135 (37)

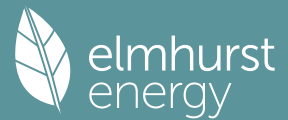
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.4668	28.3020	28.1404	27.3817	27.2397	26.5789	26.5789	26.4565	26.8334	27.2397	27.5269	27.8271	(38)
Heat transfer coeff	57.4802	57.3154	57.1539	56.3951	56.2532	55.5923	55.5923	55.4699	55.8469	56.2532	56.5403	56.8406	(39)
Average = Sum(39)m / 12 =												56.3944	
HLP	1.0963	1.0932	1.0901	1.0756	1.0729	1.0603	1.0603	1.0580	1.0652	1.0729	1.0784	1.0841	(40)
HLP (average)												1.0756	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7618 (42)
Hot water usage for mixer showers													
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(42a)
Hot water usage for baths													
23.2411 22.8959 22.4099 21.5136 20.8426 20.0985 19.6965 20.1792 20.7047 21.5009 22.4156 23.1625													(42b)
Hot water usage for other uses													
32.6721 31.4841 30.2960 29.1079 27.9198 26.7317 26.7317 27.9198 29.1079 30.2960 31.4841 32.6721													(42c)
Average daily hot water use (litres/day)													51.2501 (43)
Daily hot water use													
55.9132 54.3800 52.7058 50.6215 48.7624 46.8302 46.4283 48.0990 49.8126 51.7969 53.8997 55.8346													(44)
Energy conte 88.5529 77.4364 81.0069 69.2984 65.6436 57.5832 56.1510 59.5566 61.4239 70.2879 76.7900 87.4236													(45)
Energy content (annual)													851.1543
Distribution loss (46)m = 0.15 x (45)m													
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(46)
Water storage loss (or HIU loss):													
Total storage loss													
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(56)
If cylinder contains dedicated solar storage													
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(57)
Primary loss													(59)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(61)
Combi loss													
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(62)
Total heat required for water heating calculated for each month													
75.2699 65.8209 68.8559 58.9036 55.7970 48.9457 47.7283 50.6231 52.2104 59.7447 65.2715 74.3100													(62)
WWHRS													(63a)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(63b)
PV diverter													(63c)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													(63d)
Solar input													
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													
FGHRS													
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000													
Output from w/h													
75.2699 65.8209 68.8559 58.9036 55.7970 48.9457 47.7283 50.6231 52.2104 59.7447 65.2715 74.3100													(64)
Total per year (kWh/year) = Sum(64)m =													723.4811 (64)
Electric shower(s)													723 (64)
43.0515 38.3592 41.8868 39.9721 40.7221 38.8450 40.1398 40.7221 39.9721 41.8868 41.0992 43.0515													(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													489.7080 (64a)
Heat gains from water heating, kWh/month													
29.5804 26.0450 27.6857 24.7189 24.1298 21.9477 21.9670 22.8363 23.0456 25.4079 26.5927 29.3404													(65)

Full SAP Calculation Printout



5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.8422	86.1824	77.8422	80.4369	77.8422	80.4369	77.8422	77.8422	80.4369	77.8422	80.4369	77.8422 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	153.5409	155.1342	151.1192	142.5717	131.7821	121.6414	114.8667	113.2735	117.2885	125.8359	136.6256	146.7663 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702 (71)
Water heating gains (Table 5)	39.7585	38.7575	37.2119	34.3318	32.4325	30.4829	29.5256	30.6940	32.0078	34.1504	36.9342	39.4360 (72)
Total internal gains	320.5680	329.5004	315.5996	306.7668	291.4831	281.9875	271.6608	271.2359	279.1595	287.2548	303.4230	313.4708 (73)

6. Solar gains

[Jan]	Area m ²		Solar flux Table 6a W/m ²		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Southwest	4.7500		36.7938		0.6300		0.7000		0.7700		53.4122 (79)	
Northwest	5.9400		11.2829		0.6300		0.7000		0.7700		20.4824 (81)	
Solar gains	73.8946	132.6732	199.6004	277.6045	338.5875	348.3001	330.7375	283.3823	226.3204	151.5046	89.7476	62.4367 (83)
Total gains	394.4625	462.1736	515.2000	584.3713	630.0706	630.2876	602.3984	554.6183	505.4799	438.7594	393.1707	375.9074 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	45.5968	45.7280	45.8572	46.4742	46.5915	47.1453	47.1453	47.2493	46.9304	46.5915	46.3548	46.1100
alpha	4.0398	4.0485	4.0571	4.0983	4.1061	4.1430	4.1430	4.1500	4.1287	4.1061	4.0903	4.0740
util living area	0.9836	0.9687	0.9395	0.8608	0.7232	0.5402	0.4002	0.4500	0.6837	0.9003	0.9697	0.9863 (86)
MIT	19.4789	19.7355	20.0819	20.5206	20.8195	20.9589	20.9906	20.9850	20.8935	20.4919	19.9192	19.4418 (87)
Th 2	20.0038	20.0064	20.0089	20.0208	20.0230	20.0334	20.0334	20.0353	20.0294	20.0230	20.0185	20.0138 (88)
util rest of house	0.9798	0.9617	0.9260	0.8312	0.6708	0.4671	0.3150	0.3601	0.6106	0.8720	0.9617	0.9831 (89)
MIT 2	18.6311	18.8849	19.2231	19.6427	19.9012	20.0129	20.0304	20.0301	19.9691	19.6286	19.0775	18.6020 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.1262	19.3817	19.7247	20.1554	20.4375	20.5654	20.5912	20.5878	20.5090	20.1327	19.5691	19.0925 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.1262	19.3817	19.7247	20.1554	20.4375	20.5654	20.5912	20.5878	20.5090	20.1327	19.5691	19.0925 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9756	0.9563	0.9215	0.8356	0.6940	0.5081	0.3646	0.4122	0.6482	0.8756	0.9572	0.9793 (94)
Useful gains	384.8321	441.9849	474.7345	488.3020	437.2617	320.2239	219.6285	228.6070	327.6413	384.1666	376.3527	368.1279 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	852.2135	830.0228	755.8414	634.7502	491.5139	331.6300	221.8778	232.2950	357.9206	536.2474	705.0057	846.4965 (97)
Space heating kWh	347.7318	260.7615	209.1435	105.4427	40.3636	0.0000	0.0000	0.0000	0.0000	113.1481	236.6302	355.9062 (98a)
Space heating requirement - total per year (kWh/year)	1669.1276											
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	0.0000											
Space heating kWh	347.7318	260.7615	209.1435	105.4427	40.3636	0.0000	0.0000	0.0000	0.0000	113.1481	236.6302	355.9062 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1669.1276											
Space heating per m ²	(98c) / (4) = 31.8354 (99)											

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	522.5678	411.3832	421.5716	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9060	0.9461	0.9262	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	473.4496	389.2237	390.4721	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	708.5194	677.4716	623.1184	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	169.2503	214.4564	173.0888	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	42.3126	53.6141	43.2722	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	139.1989 (107)											
Energy for space heating	31.8354 (99)											
Energy for space cooling	2.6549 (108)											
Total	34.4903 (109)											
Fabric Energy Efficiency (TFEE)	34.5 (109)											